Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: WILSON et al.	§	Docket No.: 6000
Serial No.: 08/715,724	§	Group Art Unit: 1771
Filed: September 19, 1996	§	Examiner: C. Juska
Title: Stain Resistant Polyamide Fibers And Articles Comprising Same	§	August 2, 2000

APPEAL BRIEF

Assistant Commissioner for Patents
Washington, DC 20231

Dear Sir:

This Appeal Brief is filed (in triplicate) pursuant to Appellants' Notice of Appeal filed May 2, 2000. This brief was timely if filed by July 2, 2000, thus a one-month extension of time, up to and including August 2, 2000, is necessary. A Petition for one-month extension of time is enclosed. Please charge the fee for an Appeal Brief ($300.00); the extension fee ($110.00); and any additional fees which may be due, except issue fees, to BASF Corporation Deposit Account No. 02-1197.

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Certificate of Mailing

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the attention of: Assistant Commissioner for Patents, Washington, DC 20231.

K.M. Dellerman
Karen M. Dellerman

Date: August 2, 2000

I. REAL PARTY IN INTEREST

The real party in interest is the owner of the subject application, BASF Corporation.

II. RELATED APPEALS AND INTERFERENCE

Neither Appellants nor Appellants' legal representative are aware of any pending appeals or interferences that will be directly affected by, will directly affect or will have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS:

Claims 2-4, 9, 10, 13-15, 17 and 20-22 are presently pending in the application. This appeal is from the February 2, 2000, final rejection of all of the pending claims.

IV. STATUS OF AMENDMENTS:

The Examiner has agreed to enter the amendment under 37 C.F.R § 1.116 dated March 23, 2000. The precise wording of the pending claims, taking into account all entered amendments, is in the Appendix.

V. SUMMARY OF INVENTION:

Stain resistance has sometimes been referred to as "the holy grail" of carpet fiber technology. In the industry, stain resistance is characterized as resistance to dyeing with red drinks because these red drinks are red from coloration with acid dyes. Acid dyes are known to dye nylon and are the usual dyestuffs of choice in making colored carpeting. Coffee stains are notoriously difficult to remove from carpeting and carpet fiber which resists staining by the complex chemistry of carpet has been a challenging objective. Resistance to staining may be quantified through "ΔE" which is a measure of total color change on the CIE L*a*b* scale.

Some of the methods used to address stain resistance include topical treatments that repel stains. Topical treatments are not permanent. They tend to wash off of the fiber with the first shampooing or wear off as the carpet sees foot traffic. Permanent (i.e., washfast) stain resistance in carpet fibers has been accomplished by using inherently stain resistant polymers but, among other disadvantages, these polymers are hard to dye according to conventional wet dyeing techniques utilizing acid dyes. Appellants have discovered that carpet fibers can be made permanently acid-dye and coffee-stain resistant and still be dyed with conventional wet dyeing techniques. The fiber also exhibits improved steam heatset shrinkage properties.

Thus, Appellants' invention is an acid-dye and coffee-stain resistant carpet comprising a backing material and stain resistant sheath/core bicomponent face fibers affixed in said backing material and bound thereto (page 14, lines 18-20). The face fibers comprise a core of a first polyamide component and a sheath occupying from about 3 to 9 percent of the fiber and substantially or completely covering the core (page 8, line 15 – page 9, line 2). The fiber has a percent steam heatsetting shrinkage value which is about 70% or less of a percent steam heatsetting shrinkage value of an otherwise identical fiber consisting of only said first polyamide component (page 15, lines 13-16). In an uncolored state, the carpet of the invention has a red drink staining depth of less than 15 CIE ΔE units and a coffee staining depth of less than about 10 CIE ΔE units (page 6, lines 20-21). In a preferred embodiment, the carpet has a red drink staining depth less than about 10ΔE units (page 10, lines 12-13).

The sheath comprises a second polyamide component which is inherently chemically compatible with said first polyamide component (page 6, lines 6-8) and is at least one stain resistant polyamide polymer selected from the group consisting of:

(a) $[NH-(CH_2)_x-NH-CO-(CH_2)_y-CO]_n$; where x and y may be the same or different integers from about 4 to about 30, the sum of x and y is greater than 13, and n is greater than about 40;

(b) $[NH-(CH_2)_z-CO]_m$; where z is an integer from about 9 to about 30 and m is greater than about 40; and

(c) derivatives of (a) or (b) including polymers substituted with one or more sulfonate, halogenate, aliphatic or aromatic functionality; and

(d) copolymers and blends of (a), (b) and (c)

(page 10, line 16 – page 11, line 8). The preferred second polyamide component is nylon 12 or nylon 6/12 (page 11, lines 14-17). In a preferred form, the inherently compatible polyamide component has a concentration of titratable amino end-groups less than 30 milliequivalents per kilogram, more preferably, less than 5 milliequivalents per kilogram (page 11, lines 18-21). Also preferred is when the inherently compatible polyamide polymer is substantially sulfonate-free (page 11, lines 16-17).

The polyamide forming the core of the bicomponent fiber used in the carpet of the present invention is preferably nylon 6 or nylon 6/6 (page 9, lines 16-17). Preferably the polyamide forming the core has an amine-end-group concentration from greater than about 5 to less than about 100

milliequivalents per kilogram, more preferably, from about 20 to about 50 milliequivalents per kilogram (page 9 line 21 – page 10, line 2).

The fibers used in the carpet of Appellants' invention have a non-round cross section, and preferably, the cross-section is a multilobal cross section, such as a trilobal cross section (page 14, lines 9-10).

This invention provides the surprising advantages of coffee and red drink stain resistance without compromising dyeablility.

VI. ISSUE

The single issue presented in this appeal is as follows:

1) *Are claims* 2-4, 9, 10, 13-15, 17, and 20-22 *unpatentable under 35 U.S.C. § 103 over U.S. Patent No. 5,447,794 ("Lin") in view of U.S. Patent No. 5,468,555 ("Lijten")?*

VII. GROUPING OF CLAIMS:

Appellants group the claims as follows:

Claims 4, 13-15, 17, 20-22; and

Claims 2 and 3.

VIII. ARGUMENT:

A. Appellants' Inv nti n:

Claims 4, 13-15, 17, 20-22:

As described in the summary of the invention, Appellants' invention is a carpet made from face yarn fibers that are permanently acid dye and coffee stain resistant but which can still be dyed with conventional wet dyeing techniques. Further, the face yarn exhibits improved steam heatset shrinkage properties over fibers made from the core nylon alone.

The face fibers used in the invention are non-round bicomponent face fibers meaning that they are comprised of two distinct regions in the longitudinal cross-section. More specifically, the face fibers have a sheath/core structure wherein the sheath substantially or completely covers the core. The sheath occupies from as little as about 3 percent and up to 9 percent, by weight, of the fiber cross-section.

The core comprises a polyamide polymer and the sheath polymer is carefully selected from a claimed class of polyamide polymers to be compatible with the core. These materials include polyamides such as nylon 12 and nylon 6/12.

Claims 2 and 3:

With regard to claims 2 and 3, the sheath polymer used in the face fiber of Appellants' invention has a specified level of amino (a.k.a. amine) end groups of less than 30 milliequivalents/kilogram. More preferably, the amino end groups of the sheath polymer are less than 5 milliequivalents/kilogram.

B. The References:

Lin

Lin teaches a sheath/core fiber with reduced staining by acid dyes and articles made therefrom. The core material is selected from polyamides such as nylon 6/6 or nylon 6 or copolymers thereof. The sheath material is selected from "high carbon nylon" including nylon 12/12, nylon 6/12, nylon 12, nylon 6/10, nylon 11, et al. The weight ratio of sheath:core taught by Lin is 10:90 to 50:50. (See Lin, col. 1, lines 39-64.) Lin does not mention cross-sectional shape of the fibers except in the Example 2, where the cross-section is described as round. The other examples refer back to Example 2. Lin does not address the amine end concentration of the sheath material.

Lin teaches that coffee stain resistance and/or acid dye stain resistance can be improved by *increasing the weight ratio of the sheath to the core.* See Lin, col. 6, lines 22-24 and lines 66-67.

Lijten

Lijten is directed to sheath/core yarns and a method for making them wherein the filament-to-filament variability of the sheath percentage is allegedly improved over the prior art. That is, for a given yarn the amount of filaments that have the target ratio of sheath-to-core falls within a prescribed formula. The target ratio of sheath-to-core can be less than 10:90. Although a wide range of polymer combinations are taught by Lijten, one possible combination is polyamide sheath and polyamide core. Lijten does not address the amine end concentration of the sheath material.

C. The Rejection of Claims 2-4, 13-15, 17 and 20-22 under 35 U.S.C. §103(a):

The Examiner rejects Appellants' claims under 35 U.S.C. 103(a) applying Lin in view of Lijten. The Examiner's position is summarized in the final rejection dated February 2, 2000, as follows:

> The features of Lin have been set forth in previous Office actions. Lin discloses Applicant's inventive concept and anticipates nearly the entirety of the claimed invention. That which Lin does not disclose is multilobal filaments and a sheath content of 3% to 9%.
>
> As set forth in earlier Office actions, and not contested by Applicant, the use of multilobal filaments in Lin would have been instantly obvious to one skilled in the art. Furthermore, Lijten et

al. at column 3, lines 10-21 evidences the Examiners (sic) earlier positions.

Lijten et al. is directed to yarn formed from core-sheath filaments (Title) that are designed to have a uniform sheath which permits the use of lower sheath volumes (Abstract). Column 2 teaches that even as little as 7% sheath or less is effective following their techniques. The patent also teaches that polyamide/polyamide combinations can be used and that the fibers employed can be used in carpets. Furthermore, the patent teaches that the sheath of the disclosed fibers can improve the dye-ability of the filaments when used in carpet fiber, even if the core material is difficult to dye. Thus, one skilled in the art in possession of both Lin and Lijten et al. would have been motivated by the improved results and lower costs to modify the Lin fibers by applying the Lijten et al. techniques of producing more uniform sheaths. Such, allows for less sheath material to be employed (7% or less), which is a benefit due to its expense in relation the (sic) core material which is common nylon, without incurring any adverse effects on performance.

D. All the Pending Claims Distinguish Over the References as Applied by the Examiner

Claims 4, 13-15, 17, 20-22:

Appellants submit that the Examiner has not made a *prima facie* case of obviousness against Appellants' claims 4, 13-15, 17 and 20-22. Accordingly the rejection of these claims should be overturned. It is the Examiner's view that Lin discloses nearly the entirety of the invention except that Lin does not disclose multilobal filaments or a sheath content of about 3% to 9%. The Examiner states that the use of multilobal filaments for the

fiber of Lin would be obvious. Further, the Examiner relies on Lijten as teaching as little as 7% sheath and finds motivation for combining Lijten with Lin in Lijten's suggestion that the sheath can improve the dyeability of the fiber even if the core material is difficult to dye and further in the economics of using a thin sheath. Appellants earnestly disagree.

The Examiner's position that there is motivation to combine these references falls short of what is required to support a rejection under 35 USC §103. The Examiner points to dyeing improvements as improved results providing motivation to combine the references. Specifically, the Examiner points to the statement of Lijten that "the sheath of the disclosed fibers can improve the dye-ability of the filaments when used in carpet fiber, even if the core material is difficult to dye." These "improved results" referred to by the Examiner are not, however, applicable to Lin. In fact, the suggestion of improved dye-ability is diametrically opposed to the objective of Lin because Lin does not seek to improve dye-ability but to prevent it. Lin applies a sheath that resists dyeing, i.e. staining with acid dyes. In the April 14, 2000, Advisory Action, the Examiner attempts to refute this argument by stating, "Lin does not teach dye-resistant sheath, but rather a stain-resistant sheath." The Examiner's refutation represents a fundamental misunderstanding of the chemistry of stain resistance in the fiber vernacular, for what is a stain if not a dyed spot on a carpet? Lin recognizes

the link between staining and dyeing in col. 4, lines 19-21, where he states, "The ability of a sheath polymer candidate to resist *staining by acid dyes* can be predicted by performing a stain test on pellets of the candidate polymer" (emphasis added). Thus, it is not clear which "improved results" the Examiner relies on as motivating the ordinarily skilled to combine these references.

As to the economic advantages that the Examiner erroneously derives from Lijten, Appellants submit that the Examiner's position is deficient in several respects. First, the Examiner cites no express support for the position that economics are improved by the use of the thin sheath. Second, the supposition that there are economic advantages is not wholly supported by the circumstances. Third, the Examiner's position fails to account for the increased expense and lost process efficiency in making bicomponent fibers, especially those with a thin sheath.

The Examiner relies on improved economics to motivate the ordinarily skilled to use the lower range of sheath taught by Lijten in the bicomponent fiber of Lin. Improved economics of a thin sheath are not taught by either reference. Thus, the Examiner's assertion relies on data that is extraneous to the references and for which no express support is recited. Moreover, as cited above, Lin suggests that increasing the weight ratio of the sheath results in improved performance. What feature of Lijten suggests to the

ordinarily skilled that Lin should be ignored in this respect? The Examiner cites none.

Next, the Examiner supposes that the core material is always cheaper because it is "common nylon". The Examiner has not cited any support for the view that common nylon is always cheaper than any of the potential sheath materials. In some cases, common nylon might be cheaper but in other cases the sheath material might be cheaper. The expense of the nylon will depend, among other things, on the cost of the starting materials, the efficiency of the polymerization process used, and the market dynamics of supply and demand. Thus, it is improper to assert that common nylon is cheaper than the sheath material. The cost of the respective materials may vary on any given day.

Third, the Examiner's position does not take into account the process economics associated with making a thin sheath that substantially or completely surrounds the core. These economics might offset any cost optimization that could be gained by reducing the expensive (for the sake of argument) sheath component. It is quite difficult to ensure that a thin sheath completely or substantially surrounds a core and a high degree of process control is required to do so. It is important to note in this regard that Lijten addresses fiber-to-fiber variability and not uniformity of the sheath thickness in a single fiber. Lijten is concerned with delivering the

same amount of sheath to the fiber every time but not with how the sheath polymer is distributed once delivered. Appellants, on the other hand, are concerned more with ensuring how the sheath polymer is distributed once delivered and not so much with delivering the same amount of polymer every time because Appellants are concerned that the sheath completely or substantially surrounds the core.

Although not required to refute a *prima facie* case of obviousness, the patentability of Appellants' claims is bolstered by the surprising result they embody. For example, the heatset shrinkage observed with the present invention was not expected. Nor was it expected to achieve stain resistance with so little sheath material. Lin describes that a sheath of 10% or greater will resist staining and that improved performance follows from increasing (not decreasing) sheath thickness. Lijten suggests that even a thin sheath will improve the dyeability of a core material that resists dyeing anyway. Appellants were surprised that even the thin sheath used in the present invention resisted dye stains to the core.

Claims 2 and 3:

For the sake of brevity, Appellants incorporate their preceding arguments by reference since the same arguments apply here. Furthermore, neither of the references teach any particular amine end

group level for the sheath polyamide. The Examiner has plainly failed to make a prima facie case of obviousness against these claims. The rejection should be overruled.

Conclusion

Appellants respectfully ask the Board to overrule the Examiner's final rejection of Appellants' claims 2-4, 9, 10, 13-15, 17, and 20-22 and that these claims be allowed.

Respectfully requested,

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IX. APPENDIX

2. The carpet of claim 20, wherein said inherently compatible polyamide component has a concentration of titratable amino end-groups less than 30 milliequivalents per kilogram.

3. The carpet of claim 2, wherein said concentration of titratable amino end-groups in said inherently compatible polyamide polymer is less than 5 milliequivalents per kilogram.

4. The carpet of claim 20, wherein said inherently compatible polyamide polymer is substantially sulfonate-free.

9. The carpet of claim 3, wherein said core component has an amine-end-group concentration from greater than about 5 to less than about 100 milliequivalents per kilogram.

10. The carpet of claim 9, wherein said core component has an amine-end-group concentration of from about 20 to about 50 milliequivalents per kilogram.

13. The carpet of claim 20, wherein said fiber has a non-round cross section.

14. The carpet of claim 13, wherein said fiber has a multilobal cross section.

15. The carpet of claim 14, wherein said fiber has a trilobal cross section.

17. The carpet of claim 20 wherein said red drink staining depth is less than about 10ΔE units.

20. An acid-dye and coffee stain resistant carpet comprising:

a backing material; and

stain resistant sheath/core bicomponent face fibers with non-round cross-sections affixed in said backing material and bound thereto;

said face fibers comprising: a core of a first polyamide component; and a sheath occupying from about 3 to 9 percent of the fiber and substantially or completely covering said core, said sheath comprising a second polyamide component which is inherently chemically compatible

with said first polyamide component, said second polyamide component comprising at least one stain resistant polyamide polymer selected from the group consisting of:

(a) $[NH\text{-}(CH_2)_x\text{-}NH\text{-}CO\text{-}(CH_2)_y\text{-}CO]_n$

where x and y may be the same or different integers from about 4 to about 30, the sum of x and y is greater than 13, and n is greater than about 40; and

(b) $[NH\text{-}(CH_2)_z\text{-}CO]_m$

where z is an integer from about 9 to about 30 and m is greater than about 40;

(c) derivatives of (a) or (b) including polymers substituted with one or more sulfonate, halogenate, aliphatic or aromatic functionality; and

(d) copolymers and blends of (a), (b) and (c);

wherein said fiber has a percent steam heatsetting shrinkage value which is about 70% or less of a percent steam heatsetting shrinkage value of an otherwise identical fiber consisting of only said first polyamide component; and

said carpet in an uncolored state having a red drink staining depth of less than 15 CIE ΔE units and a coffee staining depth of less than about 10 CIE ΔE units.

21. The carpet of claim 20 wherein said first polyamide component is nylon 6 or nylon 6/6.

22. The carpet of claim 21 wherein said second polyamide component is nylon 12 or nylon 6/12.

4. EXTENSION OF TERM

NOTE: The time periods set forth in 37 C.F.R. § 1.192(a) are subject to th provision of § 1.136 for patent applications. 37 C.F.R. § 1.191(d). See also Notice of November 5, 1985 (1060 O.G. 27).

NOTE: As the two-month period s t in § 1.192(a) for filing an appeal brief is not subject to the six-month maximum period specified in 35 U.S.C. § 133, the period for filing an appeal brief may be extended up to seven months. 62 Fed. Reg. 53,131, at 53,156; 1203 O.G. 63, at 84 (Oct. 10, 1997).

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

(complete (a) or (b), as applicable)

(a) ☒ Applicant petitions for an extension of time under 37 C.F.R. § 1.136 (fees: 37 C.F.R. § 1.17(a)(1)-(5)) for the total number of months checked below:

Extension (months)	Fee for other than small entity	Fee for small entity
☒ one month	$ 110.00	$ 55.00
☐ two months	$ 380.00	$ 190.00
☐ three months	$ 870.00	$ 435.00
☐ four months	$ 1,360.00	$ 680.00
☐ five months	$ 1,850.00	$ 925.00

Fee: $ 110.00

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

☐ An extension for _____ months has already been secured, and the fee paid therefor of $_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request $_____

or

(b) ☐ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee $ 300.00

Extension fee (if any) $ 110.00

TOTAL FEE DUE $ 410.00

6. FEE PAYMENT

☐ Attached is a check in the sum of $_____.

☒ Charge Account No. 02-1197 the sum of $ 410.00.

A duplicate of this transmittal is attached.

7. FEE DEFICIENCY

NOTE: If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to change the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, *1065 O.G. 31-33.*

☒ If any additional extension and/or fee is required, this is a request therefor and to charge Account No. 02-1197.

AND/OR

☒ If any additional fee for claims is required, charge Account No. 02-1197.

K.M. Dellerman

SIGNATURE OF PRACTITIONER

Reg. No.: 33,592

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